

NAVAL MEDICAL RESEARCH AND DEVELOPMENT NEWS

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Former NAMRU-2 Employee Helps with NMRC/NIH Vaccine Trial

When the U.S. Naval Medical Research Unit No. 2 ([NAMRU-2](#)) closed the laboratory in Jakarta in 2010 and moved to Hawaii, the Indonesian foreign service nationals, highly skilled in a variety of areas ranging from outbreak investigations to virus identification to the conduct of clinical trials, entered the job market and were welcomed additions to the Indonesia workforce. Awalludin Sutamihardja, who spent 18 years working in the Parasitology Department at NAMRU-2, moved on to the Walter Reed Army Institute of Research malaria project in Tanzania. While there, Sutamihardja 'trained the trainers' in malaria microscopy, one of the most important skills in a country where malaria is a leading cause of sickness and death.

This year, Sutamihardja is assisting Navy researchers at the Naval Medical Research Center ([NMRC](#)) in Silver Spring, Md. with an important clinical trial currently underway at the National Institutes of Health (NIH) National Institute of Allergy and Infectious Diseases (NIAID) Vaccine Research Center (VRC) in Bethesda, Md.

"This trial represents a collaboration with VRC, Walter Reed Army Institute of Research [WRAIR] and NMRC to test a radiated attenuated sporozoite malaria vaccine call PfSPZ Vaccine, from Sanaria, an industry partner," said Capt. Judith Epstein, NMRC lead investigator on the trial. "VRC is immunizing the volunteers, WRAIR is challenging the volunteers with malaria-infected mosquitoes to test the efficacy of the vaccine, and NMRC is providing expertise and support, including the critical immunoassays assessing the immunogenicity of the vaccine in healthy adult volunteers. We are delighted to have

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Awalludin Sutamihardja (left) with Capt. Thomas L. Richie. Sutamihardja, a former NAMRU-2 employee from Indonesia, is now assisting NMRC with a malaria vaccine clinical trial.

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Commanding Officer's Message

It's hard to know where to start my final column for this newsletter. After a career of almost 30 years in the Naval Service, I find that I'm feeling as if I'm not ready to leave yet. I'm going to take some literary license and reflect on my last three years as CO of the Naval Medical Research, Development, Testing and Evaluation Enterprise.

It has been an unusual time of transition—both BRAC and non-BRAC related. It is said that command is the highest privilege the Navy can bestow on an officer, and as we all know, there are many more qualified officers than there are command positions available. I feel truly honored and extremely humbled to have been one of the chosen few. I have been truly blessed by having an exceptional crew, including government civilians and contractor support.

The Navy Medical R&D Enterprise is a large, complex, global organization unlike any other in the U.S. Navy. It requires a great deal of attention, flexibility and dedication and an outspoken champion. I am extremely proud of our accomplishments, both naval and scientific, during my three-year tenure. I would like to take credit for them, but it is really the staff that earns it. Perhaps I helped and didn't hinder them while I was at the helm.

At a time like this, I wish I were more eloquent. I would like to end my final column by using a quote of President John F. Kennedy who wrote in August 1963, "Any man who may be asked in this century what he did to make his life worthwhile, I think can respond with a good deal of pride and satisfaction, 'I served in the United States Navy.'" That is how I truly feel about our medical research enterprise mission in support of our nation and her warfighters.



Commanding Officer sends,
Richard L. Haberberger, Jr.
CAPT, MSC, USN

In Memoriam – NAMRU-3 Staffer Helene Mayerakis Zartarian



Helene Mayerakis Zartarian passed away July 15 in Cairo, Egypt. Zartarian served as the secretary to the commanding

officer of the U.S. Naval Medical Research Unit No. 3 ([NAMRU-3](#)) for 28 years and continued as a part-time protocol assistant for almost 20 more years. She felt that NAMRU-3 was her family, and her loyalty manifested itself in selfless service spanning evacuations, a revolution and eighteen commanding officers.

Almost all NAMRU-3 staff were introduced to the laboratory and to

Egypt by Zartarian. She also greeted and guided countless command guests during their visits. The consummate hostess and guide to the Egyptian Khan El Khalili, she left a lasting impression on all who met her. Always immaculately dressed and totally composed, she organized hundreds of social events and shared her extended contacts in the community of Greek and Armenian Egyptians.

Zartarian became ill earlier this year. She is survived by her sister, Georgette Grivetti of Davis, California, who returned to Cairo to be with Zartarian during her illness, and by her niece, Joanna Grivetti Moore.



Helene Mayerakis Zartarian

NAMRU-2 Detachment Phnom Penh Participates in ASEAN Regional Forum, U.S. Secretary of State's Visit to Phnom Penh

From NAMRU-2 Public Affairs

U.S. Secretary of State Hillary Rodham Clinton led the United States' delegation to the 19th Meeting of the Association of Southeast Asian Nations (ASEAN) Regional Forum (ARF) in Phnom Penh, Cambodia, July 12.

Clinton asked about NAMRU-2 activities within the region, and Chuang described NAMRU-2's mission in Southeast Asia, primarily focusing on the medical research and surveillance activities...and the lab's support to the Cambodian Ministry of Health....

The ARF is the region's broadest and oldest security dialogue forum. During the Secretary of State's visit, the U.S. Naval Medical Research Unit No. 2 ([NAMRU-2](#)) Detachment Phnom Penh's military staff had the honor of

representing the U.S. Embassy Phnom Penh and NAMRU-2. Cmdr. Steven Newell, detachment director, was the bilateral control officer. In addition to providing direct oversight of host-nation support staff, Newell's primary assignment was preparation of the designated U.S. bilateral meeting spaces inside the Peace Palace, the Royal Cambodian Government offices of Prime Minister Hun Sen. Cmdr. Ilin Chuang, a preventive medicine physician, was the control officer for the U.S. Ambassador to Cambodia, William E. Todd; and Lt. Michael Prouty, microbiologist, served as a baggage control officer (not as easy as it sounds!). The lead-up to the event involved thousands of man-hours for the embassy staff.

Chuang had the task of arranging the ambassador's schedule. After the Secretary of the State met with Cambodian human rights advocates and embassy staff, Todd introduced her to Chuang. Clinton asked about NAMRU-2 activities within the region, and



U.S. Secretary Hillary Rodham Clinton arrives at Phnom Penh, Cambodia for ASEAN Regional Forum.

Chuang described NAMRU-2's mission in Southeast Asia, primarily focusing on the medical research and surveillance activities for infectious diseases, specifically malaria, dengue, chikungunya and febrile illness, and the lab's support to the Cambodian Ministry of Health on control of outbreaks such as the current enterovirus 71 (EV71) outbreak.

Clinton was curious about the EV71 outbreak, in particular why it was happening now and why it affects mostly children. Chuang explained that EV71 has been circulating throughout Asia since 1997, and it is highly likely that EV71 has been affecting Cambodian populations for years but has not been detected until now. Clinton appeared satisfied with the impromptu briefing, and Todd commended Chuang for her thorough and quick explanation of what has been happening.

Many embassy staff and others in attendance commented on the generous and valuable support of the naval officers of NAMRU-2 Detachment Phnom Penh. NAMRU-2 staff commented on how proud they were to have served during this historic and significant occasion in Cambodia and look forward to participating in more events in the future.



U.S. Secretary Hillary Rodham Clinton meets the children of the NAMRU-2 and U.S. Embassy staff.

WRNMMC Infectious Disease Fellows Tour NMRC and WRAIR

New infectious disease fellows from the Walter Reed National Military Medicine Center (WRNMMC) in Bethesda, Md., toured the Naval Medical Research Center (NMRC) and the Walter Reed Army Institute of Research (WRAIR) at the Army's Forest Glen Annex in Silver Spring, Md., July 10.

Two of the fellows are beginning their three-year training program in clinical infectious disease and one fellow is starting her second year of the training program. During the tour, they learned about potential Navy and Army research projects in which they can participate. Lt. Cmdr. Janine Danko provided an overview of the Navy's Research and Development Enterprise and organized the tour. The fellows toured the WRAIR Clinical Trials Center, the Insectary, and the Pilot Biofacility and met with NMRC/WRAIR infectious disease

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From left: Lt. Ashley Jackson and Lt. Kerry Wilson, WRNMMC infectious disease fellow, with Lt. Cmdr. Janine Danko and Cmdr. Nimfa Teneza-Mora of NMRC.

Navy Researcher Gets High Marks for STEM Presentation

Cmdr. Guillermo Pimentel received rave reviews from high school students participating in the Hagerstown Community College (HCC) Biotechnology Summer Institute in Hagerstown, Md., July 18. During his two-hour presentation, Pimentel, the deputy director of the Naval Medical Research Center (NMRC) Biological Defense Research Directorate (BDRD) located at Fort Detrick in Maryland, provided an overview of laboratory-based surveillance of infectious diseases. He shared stories about a career that has taken him around the world, including seven years at the U.S. Naval Medical Research Unit No. 3 in Cairo, Egypt.

The advanced high school students were selected to take part in an eight-week competitive program sponsored by the National Science Foundation and HCC. The Biotechnology Summer Institute is a unique opportunity for high school students to get a head start on earning college credit while exploring careers in biotechnology; the



Cmdr. Guillermo Pimentel addresses high school students at the Hagerstown Community College Biotechnology Summer Institute.

students will earn seven college science credits. During his presentation, Pimentel also talked about career paths in biotechnology, including the role of clinical microbiologists working

on global health issues.

"It was a great honor and pleasure to present my field stories to such a smart group of high school students.

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Marine Expeditionary Rifle Squad's First Navy Physiologist Moves On

Cmdr. Demetri Economos, the first Navy physiologist assigned to the Marine Expeditionary Rifle Squad (MERS) facility in Quantico, Va., completed his tour and is moving on to the Naval War College, Newport, R.I., as an International Programs Officer. Economos, who has collaborated on projects with MERS since 2004, was permanently assigned to the facility in 2010 because of his unique qualifications, strong acquisition background, and previous experience with the Marine Corps (USMC Command and Staff College and Marine Corps Combat Development Command).

MERS, a project office within Marine Corps Systems Command (MCSC), is a program designed to apply a systems engineering approach to equipping a Marine rifle squad as an integrated weapons system. MERS looks at the integration and configuration management of all components that are worn, carried and consumed by the squad to increase the mobility and survivability of infantry forces.

Economos worked on several projects. A few examples include developing in-theater heat stress protocols, improving backpack design for warfighters, proposing a training curriculum to prevent hearing injury and resolving vibration injuries for Marine test shooters.

"The heat stress study, based on in-theater thermal stressed data, was designed to determine how hot Marines become when wearing full combat loads during patrols in operational settings," said Economos. "We developed a thermal stress model to predict core temperature based on heart rate, which allows squad leaders to objectively identify when Marines are reaching heat exhaustion."

The MERS team conducted a USMC backpack field trial to determine the best pack for USMC. Economos, along with infantry subject matter experts and equipment specialists, was on site to support the trial and field-testing of several backpacks, including a corpsman variant, leading to the selection, procurement and full fielding to the Marine Corps by the end of fiscal



NMRC CO Capt. Richard L. Haberberger, Jr. (left) with Cmdr. Demetri Economos.

year 2012.

The MERS team, in conference with Navy Medicine leadership, identified the need to establish a hearing conservation curriculum for inclusion into The Basic School (TBS) training in Quantico, Va.

"The greatest and most preventable injury in the Marine Corps is hearing loss. When you think about developing a DOTMLPF (Doctrine, Organization, Training, Material, Leadership, Personnel, Facilities) solution to address a Fleet need, not everything has to be a material solution. Sometimes the best solution can be a training or leadership solution," said Economos. "All newly commissioned officers in the Marine Corps, regardless of source, attend TBS prior to their MOS [military occupational specialty] assignment. This makes TBS an ideal venue for the introduction of a hearing conservation curriculum. It will develop a culture of hearing protection not only from the top down but for the next generation of Marine Corps leadership."

Another project addressed the concerns of test shooters who were experiencing soreness in their arms and hands.

"Just like you have test pilots, you have test shooters," said Economos. "Test shooters are required to perform live fire testing of the weapon in order to problem solve weapon issues and

provide subject matter expert input to test engineers. They were shooting 1,000 rounds a day, every day, until weapon failure. They started to complain of soreness in their arms and hands and didn't understand why so they asked us to help."

Following on-site observations, hands-on weapons firing, and medical/engineering literature research, the MERS team recommended a short-term solution of reducing the number of rounds fired each day or doubling the number of shooters in order to decrease vibratory exposure.

"The long term solution is to develop a test operations procedure manual to cover every weapons system in the Marine Corps inventory in order to define testing procedures and set limits for test shooter exposure to hand-arm vibratory stress," said Economos.

"Having an experienced [NMRC](#) physiologist researcher with human systems integration experience at MERS provided an opportunity for hands-on research and a direct avenue to communicate Navy Medicine's capabilities to the Marine Corps," said Economos. "This was good for everybody - the NMRC enterprise, Navy Medicine, and the Marine Corps. I am proud to have been part of the team and have to thank NMRC and MCSC for this unique opportunity."

NAMRU-3 Supports Multinational Force/Observers in the Sinai

A team from the U.S. Naval Medical Research Unit No. 3 ([NAMRU-3](#)) in Cairo, Egypt provided vector biology and preventive medicine guidance to the Multinational Force and Observers (MFO) in the Sinai in May. The team included NAMRU-3 vector biology laboratory technician Noha Watany and Capt. Jesse Monestersky, who provided vector biology and preventive medicine guidance when the team visited six remote sites for vector assessment.

At the request of the MFO's preventive medicine unit, the assistance visit focused on improving MFO Sinai vector surveillance, reporting, and vector control. The joint MFO preventive medicine unit and NAMRU-3 team assisted with identification and control of the filth fly, sand fly, and mosquito vectors, which can transmit diseases to soldiers or are of high nuisance importance. The team set up traps



Capt. Hinnerichs, Noha Watany, MFO PrevMed staff, and the Colombian contingent in area CP2-C following CDC light trap demonstration.

staff on infectious diarrhea and an introduction to occupational medicine, including a discussion on threats posed by open pit burning. He also provided a lecture on mass casualty to MFO North Clinic staff.

The NAMRU-3 team was able to provide highly relevant and needed support to address the mosquito problem in the South Camp area. Hinnerichs said, "This visit paved the way for future collaboration and operational support to MFO on pest control (filth flies, mosquitoes, sand flies) and for entomology research with joint collaboration between MFO PrevMed and NAMRU-3 Vector Biology."

Future work is planned to include novel methods of sand fly control, including Ivermectin impregnated rodent food pellets and fungal application into rodent burrows, and potential diarrheal study collaboration.



Noha Watany and Sergeant First Class Ishmael in MFO preventive medicine laboratory.

and instructed the preventive medicine staff on collection and processing of the specimens to be sent to NAMRU-3. Training was conducted on sand fly trapping and processing and leishmaniasis. Capt. Hinnerichs, Deputy of Force Preventive Medicine, said, "Ms. Noha had studied the sites before the visit and knew the issues she'd meet, making the visit extremely productive."

The MFO also requested clinical support for healthcare providers at South and North Camp clinics on diarrheal disease, occupational medicine, and principles of mass casualty. Monestersky provided training to South Camp clinic



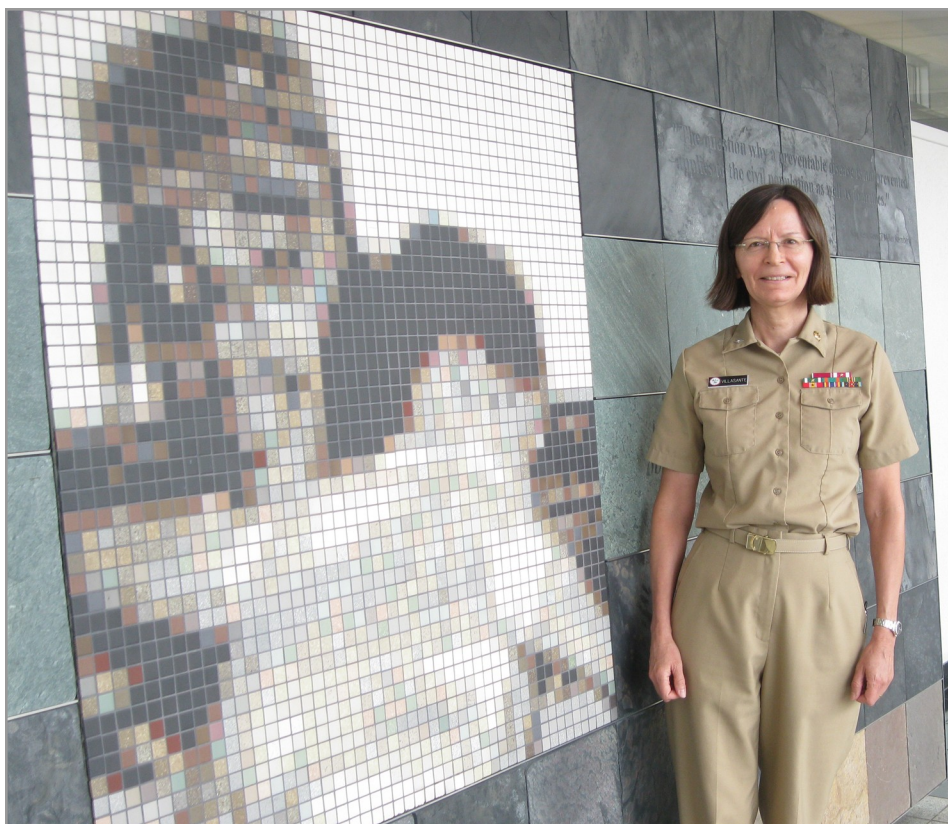
MFO's Capt. Hinnerichs and NAMRU-3's Noha Watany checking filth fly trapping devices.

NMRC Researcher Gives Address on Malaria Vaccine Development

Malaria represents a major challenge to the readiness and fitness of deployed U.S. military personnel. In World War II nearly 700,000 military personnel were hospitalized for malaria, with nearly 400 deaths, and in Vietnam almost 65,000 personnel were hospitalized, with more than 120 deaths. Malaria took its toll during a Liberia peacekeeping mission in 2003, Operation Mountain Thrust in Afghanistan in the summer of 2006, the Benin humanitarian exercise in July 2009, and the Haiti earthquake response in 2010.

Malaria is also responsible for more than 655,000 civilian deaths worldwide yearly, mostly in sub-Saharan Africa. Although malaria control interventions have been scaled up over the past decade, reducing mobility and mortality, the disease continues to pose a major public health threat in many counties. This, coupled with the increasing parasite resistance to available antimalarial drugs, points toward the urgent need for an effective malaria vaccine.

Capt. Eileen Villasante, head of the Naval Medical Research Center (NMRC) malaria department, was invited to present at the 10th Annual Vaccines Research and Development: All Things Considered conference in San Francisco to discuss several approaches to the development of Department of Defense malaria vaccines, including whole parasite immunization and gene-based and recombinant protein-based vaccines.



Capt. Eileen Villasante, head of the NMRC malaria department.

RTS,S/AS01 *Plasmodium falciparum* malaria vaccine in a large-scale field trial in Africa showed an approximately 56 percent reduction in clinical malaria in children five to seventeen months of age. If the final results of this trial, which will become available in 2014, confirm these data, it is possible that the first, partially effective malaria vaccine could be licensed as early as 2015 for use in some African countries.

mediated immunity. Discovery of additional target malaria antigens, improvements in vaccine delivery, and refinements of prime-boost combinations remain challenges for the future.”

During her presentation, Villasante discussed the worldwide malaria disease burden and the impact of malaria control interventions. She went on to outline the complex malaria parasite and its life cycle and how understanding the malaria life cycle within the mosquito and within the human body led to a number of approaches to malaria vaccine development. She summarized the current three approaches to malaria vaccine development – whole parasite, recombinant protein and gene-based vaccines.

Research at the Naval Medical Research Center focuses on solutions to operational medical problems such as naturally occurring infectious disease, battlefield neurotrauma and wound infections, decompression sickness, biological threat agents and bone marrow injury research.

“Doctor,” he said, “This will be a long war if for every division I have facing the enemy I must count on a second division in the hospital with malaria and a third division convalescing from this debilitating disease!” General Douglas MacArthur – May 1943.

“This was a great opportunity to raise awareness of our efforts to vaccine researchers and developers worldwide,” Villasante said. “The recently reported interim results with the

Additionally, very promising pre-erythrocytic malaria vaccine strategies are prime-boost vaccination with DNA and virally vectored platforms and attenuated sporozoites to induce cell-

Investigating a 2009 Shipboard Outbreak of Pandemic Influenza

From NHRC Public Affairs

In military ship settings, close living and working environments can contribute to the rapid spread of illness in a healthy young adult population. During April 2009, the initial cases of H1N1 virus infection were identified in San Diego County and Imperial County, Calif. This novel virus subsequently resulted in a pandemic declared by the World Health Organization (WHO) in June 2009.

While training off the Southern California coast in July and August 2009, dozens of sailors and Marines aboard the USS Bonhomme Richard (LHD 6) experienced an outbreak of respiratory illness with reports of fever, cough and body ache. During the outbreak, 161 people out of a crew of more than 2,000 sought medical care at the shipboard clinic, and ill personnel with signs and symptoms suggestive of influenza were treated. The illness was self-limited and mild, and no hospitalizations were required. However, due to the mildness of disease, the actual number of infected crew members was unknown. In order to determine disease burden, researchers from the Navy Environmental and Preventive Medicine Unit No. 5 (NEPMU-5), the Centers for Disease Control, and the Naval Health Research Center ([NHRC](#)) in San Diego conducted an investigation to characterize

the outbreak, estimate the overall attack rate, and assess shipboard risk factors. They determined the overall infection attack rate was higher than originally thought.

"We administered questionnaires, reviewed available medical records, and collected post-exposure sera from crew members," said Cmdr. Patrick Blair of NHRC. "We used microneutralization assays to detect H1N1 virus neutralizing antibodies and found that more than half of the flu infections were asymptomatic and the attack rate was higher than estimated by clinical illness alone."

Researchers determined that the overall influenza attack rate was 32 percent.

"To our knowledge, this is the first study on a naval vessel to use seroepidemiological analysis on matched pre and post-exposure sera and a questionnaire to estimate infection attack rates, including asymptomatic or subclinical infections," said Lt. Cmdr. Kellie McMullen of NEPMU-5. "From our study, over half of the confirmed H1N1 infections were asymptomatic. It was the availability of baseline sera that afforded the opportunity to serologically confirm the subclinical infection."

Because a large proportion of infected personnel had mild illness and did not seek medical care, adherence to infection control interventions was

important to interrupt respiratory disease transmission.

"During the outbreak, the ship's medical staff's infection control interventions contributed to the interruption of the outbreak during the 35-day training exercises. An outbreak during an extended deployment, during which isolation or social distancing might be infeasible, could result in greater illnesses and potential negative impact to ship operation," said Blair.

"Enhanced infection control measures may be useful to control shipboard influenza outbreaks," said Blair. "Measures can include pre-embarkation illness screening, improved self-reporting of illness, isolation of ill and quarantine of exposed contacts, prompt antiviral chemoprophylaxis and treatment may be useful to control shipboard influenza outbreaks."

Maintaining laboratory surveillance programs for early detection of respiratory illness outbreaks, including influenza testing, would enable prompt intervention for disease mitigation, control and prevention.

NHRC works closely with operational units by conducting medical modeling and simulation analysis; monitoring the effects of combat exposure on psychological health, managing career-span deployment health and readiness programs, and improving warfighter performance.

NAMRU-Dayton Scientists Participate in Hypoxia Roundtable

The Hypoxia Modeling, Physiologic Monitoring, and Mitigation Roundtable was held in Atlanta, Ga., under the auspices of the Technical Cooperation Panel (TTCP) Human Resources and Performance (HUM) Group in May. The meeting brought representatives from five European allied governments, industry, and from across the U.S. services to discuss novel approaches to mitigate the occurrence of in-flight hypoxia. Dr. Jeffrey Phillips and Dr. Rick Arnold of Naval Medical Research Unit-Dayton ([NAMRU-Dayton](#)) were both in attendance.

Phillips presented his research comparing detection times of several

technologies proposed for in-cockpit hypoxia identification. The data for gas sensors clearly showed that hypoxia detection occurred a full six minutes earlier when compared with more conventional hypoxia detection sensors such as pulse or reflectance oximetry. Phillips' presentation also addressed an observed delay in cognitive performance recovery following exposure to hypoxia. The apparent delay in recovery bolsters the argument for an early warning system that does not require operators to self-detect hypoxia, providing more time for corrective action.

During the afternoon roundtable,

the discussion focused on identifying an effective and reliable system to provide early hypoxia detection across military aviation platforms. Although many ideas were expressed, a general consensus was reached that the development of an in-cockpit hypoxia detection and warning system will require a significant research and development effort. The Office of Naval Research plans a follow-up meeting as well as an industry day in the near future to identify potential off-the-shelf solutions. NAMRU-Dayton researchers are continuing research efforts into this critical area of need for the fleet.

NAMRU-3's Contributions to AUC-ASCPi Training Program

From NAMRU-3 Public Affairs

For the first time in Egypt, medical technologists completed a specialized training program in accordance with globally recognized standards. U.S. Naval Medical Research Unit No. 3 (NAMRU-3), Cairo, Egypt, was instrumental to the success of the first session of the American University in Cairo's (AUC) Medical Technology – American Society for Clinical Pathology International (ASCPi) training program.

Hassan Azzazy, founder of AUC's Medical Technology Training Program and professor of chemistry at the School of Sciences and Engineering, said, "The program provides students with high-caliber mentors as well as the opportunity to use state-of-the-art analytical instruments and systems at leading medical laboratory facilities in Egypt, including Al-Mokhtabar Laboratories, the United States Naval Medical

Research Unit No. 3, and Shabrawishi Hospital."

Involved in the development of this highly competitive program and the screening of specially chosen applicants, NAMRU-3's scientific and laboratory staff provided lecture and laboratory sessions for the Microbiology Module of the program. NAMRU-3 staff conducted formal lectures followed by hands-on lab training. The first group of students agreed that NAMRU-3's faculty, content of material presented, organization, schedule of lectures and lab sessions, and evaluation of material covered exceeded their expectations and fully met the objectives of the microbiology module.

NAMRU-3 will begin its second year of training for the microbiology module of the certification program in August 2012. The training is designed to provide this class of outstanding student professionals with the requisite skill set

necessary to sit for the U.S.-based ASCP certification, which is globally accepted as the gold standard in clinical laboratory proficiency for laboratory technicians. The program expects all its graduates to sit for the exam, which is offered in testing centers across the world.

NAMRU-3's College of American Pathology (CAP) accredited laboratory coordinator, Lt. Cmdr. Samuel Levin, and the assistant coordinator, Lt. Gabriel Defang, both of whom recently joined the ASCPi Egypt Board of Directors, have high expectations for this class.

Levin said, "We are extremely honored to be involved in the development of a new crop of outstanding laboratorians, who with hard work and dedication will be laboratory operations and testing leaders directing laboratory analysis of the highest quality for years to come in Egypt."



NAMRU-3 staff with American University in Cairo students at the conclusion of the microbiology module taught at NAMRU-3.

Researchers Participate in Medical Research and Diplomacy Course

Naval Medical Research Center (NMRC) researchers participated in a military training course designed to equip military health professionals with an understanding of the connection between biomedical research conducted overseas and medical diplomacy. With Armed Forces Health Surveillance Center (AFHSC) – Global Emerging Infections Surveillance and Response System (GEIS) funding, George Washington University and the Stimson Center in Washington, D.C. sponsored a week-long course for military scientists and physicians who may be assigned overseas.

The course offered a framework for analyzing the issues that affect public health research and capacity-building and the mechanisms for interagency and intergovernmental coordination and cooperation, as well as concepts of management in a multicultural context.

As field researchers in host countries, Navy Medicine scientists are often called to partner with their peers in host governments, international organizations, local communities, and across multiple U.S. agencies as they participate in public health programs.

Capt. Eric Hall, Navy Medicine microbiology specialty leader and director of the NMRC Wound Infections Department, joined Capt. John Sanders, NMRC executive officer, and Dr. Stephen Walz, NMRC director of Field Laboratory Operations, in panel discussions and presentations.

"I had the opportunity to participate in the laboratory research manage-

ment panel discussion," said Hall. "I could share my experience with clinical diagnostic labs at our overseas research facilities in Cairo, Egypt and Lima, Peru. We also discussed compliance and regulation challenges of setting up a lab in another country. We discussed the issues of multiple overlapping regulatory frameworks on research collaborations that include integrating local, U.S. government, and international research norms and requirements in such areas as human subject protections, animal use, worker safety, laboratory biosafety and biosecurity and such."

Walz provided the attendees with a case study overview analyzing the role and function of the U.S. Naval Medical Research Unit No. 2 in Jakarta, Indonesia. He discussed [NAMRU-2's](#) history from Guam, to Taipei, Manila and Jakarta, and finally to Hawaii in 2010.

"The mission of the Navy and Army overseas medical research labs is to identify infectious disease threats of military and public health importance and to develop and evaluate interventions and products to mitigate those threats. The overseas labs also support combatant commanders' theater security cooperation through engagement of nations in the region in the conduct of our mission," Walz said.

He added that in meeting this mission, the overseas labs positively engage U.S. and foreign national military, public and private health and research agencies, non-governmental organizations and academia in collaborative research and surveillance projects, many of which enhance the foreign agencies' capacity to address the infectious disease threats of mutual interest.

"Attendees received a solid foundation on the resources and requirements for military researchers working overseas and helped to build their understanding to successfully plan and implement public health surveillance, research, and capacity-building programs at the host country level that aligns with the U.S. national security and global health strategies," Hall



Capt. Eric Hall

added.

The Naval Medical Research Center currently supports three overseas biomedical laboratories. The U.S. Naval Medical Research Unit No. 2 Pacific, Pearl Harbor, Hawaii, conducts infectious disease research and surveillance in South Asia and Southeast Asia. Current studies include respiratory disease surveillance, malaria drug resistance, novel vector control measures and dengue cohort monitoring. The lab's goal is to study tropical diseases where they occur and where new preventive measures and treatments may be tested and evaluated.

The [U.S. Naval Medical Research Unit No. 3](#) in Cairo, Egypt, conducts infectious disease research and surveillance in the Middle East, Southwest Asia, Africa and Eastern Europe. Current studies focus on influenza-like illness, acute febrile illness, diarrheal diseases, hemorrhagic fever, HIV, and infection control.

The [U.S. Naval Medical Research Unit No. 6](#) in Lima, Peru, conducts infectious disease research and surveillance in South America that includes prevention strategies, clinical trials, epidemiology and ecology. Researchers partner with the Peruvian Army and Navy, prestigious universities like Cayetano-Heredia and San Marcos, the Ministry of Health, the U.S. Agency for International Development, the U.S. Centers for Disease Control and Prevention, the U.S. National Institutes of Health, and several American universities.



Penn State Science Interns are Excelling at WRAIR/NMRC

During the summer months, on any given day, students can be seen walking through the hallways of WRAIR/[NMRC](#). Many of them are interested in a career in science and technology. What better place to jumpstart a career than here?

The Eberly College of Science at Penn State University has a partnership with both the Walter Reed Army Institute of Research (WRAIR) and the Naval Medical Research Center (NMRC). This partnership has been around for over a decade, beginning in the late 1990s. Through a colleague, Dr. David Lanar, Malaria Vaccine Branch (WRAIR), learned of the Penn State Co-op Program; he began hosting a student in 2001. Lanar was able to give his student meaningful projects to work on. After seeing the benefits for both parties, student and mentor, Lanar wanted to expand this opportunity not only by sharing it with WRAIR military and civilian researchers, but also by reaching out to NMRC and its staff.

"By 2005, the program was attracting so much interest from the Penn State Co-op students that we often had twelve or more students coming in for

interviews," said Lanar.

After running the program successfully for so long and recruiting an estimated 100 students into internships, he passed the torch to Dr. Alexander Maue and Lt. Brian Pike, who now coordinate this program. They are both scientists in the Enteric Diseases Department at NMRC.

After a highly competitive interview and selection process, Pike and Maue succeeded in matching six interns with mentors at WRAIR/NMRC. The matches were based both on the interest of the individual student and the scientific needs of the respective laboratories. The matches this year resulted in students working on varied projects related to the development of enteric bacteria and malaria vaccines. The students began their projects in June and will continue their work through December. Preliminary results of their research will be presented as a scientific poster this month. Both the students and mentors are benefitting from a relationship that could potentially catapult a promising career for many of the students in the biotechnology industry.

One of the mentors, Capt. Stephen Savarino, head of the NMRC Enteric Diseases Department, said, "These students are of high caliber and they exhibit a strong dedication to such an excellent program."

The Penn State director of Science Career and International Education, Paul Shaffner, oversees all of the Co-op and internship programs for the Eberly College of Science. Many of the students that intern at WRAIR/NMRC are in the master's program for biotechnology.

Shaffner said, "The partnership has been an incredible asset to students. In an increasingly competitive global research climate, the professional skills and research experience that our students glean as part of these research teams is invaluable. The ability to put their classroom and lab knowledge into practice in a professional setting is critical to students' academic and professional development. Penn State greatly appreciates the long-standing commitment of WRAIR/NMRC to the students of Penn State and looks forward to continued partnership in the years to come."



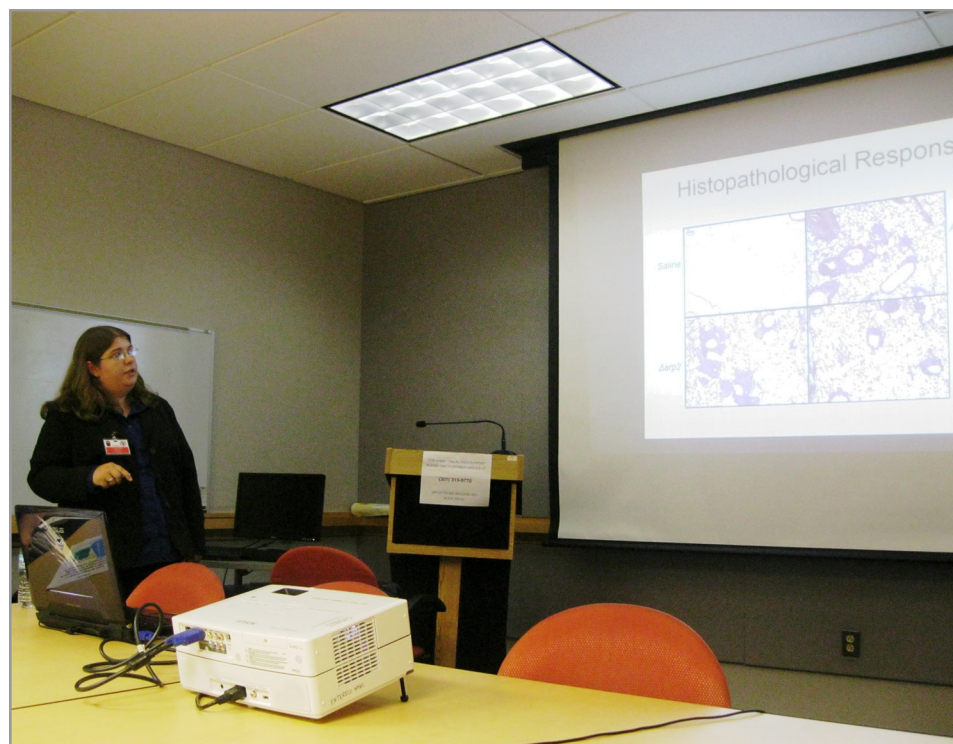
From left: Dr. Evelina Angov, Karen Bingham, Andrea Strein, Deepika Vaidyanathan, Dr. Frédéric Poly, Jason Thomas, Capt. Stephen Savarino, Dr. Steven Poole, Dr. Milton Maciel, Muammar Mansor, Stephen Wellard, Dr. Alexander Maue, Lt. Brian Pike. Not pictured: Dr. Joao Aguiar, Dr. Patricia Guerry-Kopecko, Swati Ramadorai, Dr. Emily Smith.

NMRC Seminar—Developing a Mouse Model of Fungal Exposure

Amanda Buskirk, a Ph.D. candidate at West Virginia University, did her dissertation work at the National Institute for Occupational Safety and Health (NIOSH) in Morgantown, W.V., with expertise in developing mouse models of inhalation exposures and pulmonary immunology. Buskirk recently gave a seminar for the [Naval Medical Research Center](#) titled, “Developing and characterizing a mouse model of *Aspergillus fumigatus* exposures” that encompasses five years of work.

Aspergillus fumigatus is a ubiquitous spore-forming fungus commonly found in outdoor and damp environments. The spores easily become airborne and subsequently inhaled by humans. Under normal circumstances, the immune system will clear the spores without causing any damage. However, if a person is immunocompromised (cancer, AIDS, or transplant patients) or they routinely inhale large numbers of the spores, disease may ensue, including invasive infections and allergy/asthma. The goals of Buskirk’s research are to identify the fungal-specific components that allow the fungus to cause disease and to develop an animal model of dry fungal exposures that closely resembles natural human exposures.

To address the first goal, Buskirk focused on the impact of fungal pigments (responsible for *A. fumigatus*’ dark green color) on the mouse immune responses following repeated inhalation exposures. She and her colleagues at NIOSH have determined the presence of melanin can impact populations of immune cells



*Amanda Buskirk, a Ph.D. candidate at West Virginia University, discusses “Developing and characterizing a mouse model of *Aspergillus fumigatus* exposure.”*

associated with allergy and the body’s ability to clear the fungus. To address the second goal, Buskirk discussed the collaborative work done to develop a new, unique chamber used to expose mice to dry fungal particles. The dry system is necessary because common animal models of fungal exposure use techniques that may alter the spore surface, thereby impacting the way the immune system recognizes and clears the spore.

While Buskirk’s research focuses on one fungus, thousands are present in different environments. The devel-

opment of an animal model that closely resembles natural exposures will help determine how fungi cause disease, which is currently unclear. This research may impact warfighters, who may routinely be present in damp environments that harbor fungal spores and develop infection or allergies/asthma from chronic inhalation. By understanding how the dry fungus impacts the immune response, it may be possible to develop better prevention and treatment methods to protect soldiers and civilians alike.

WRNMMC Infectious Disease Fellows Tour NMRC and WRAIR

(Continued from page 4)

physicians and researchers in various departments, including enterics, malaria, wound infections and viral and rickettsial diseases.

NMRC’s Infectious Diseases Research Directorate conducts research on infectious diseases that

are considered to be significant threats to deployed military personnel. Significant threats are those that have the potential to incapacitate a large number of deployed forces over a short time period, hindering the ability of warfighters to accomplish their

mission. The geographical distribution of a disease; the lack of an effective vaccine, treatment or other control measures; the mode of disease transmission; and the historical impact during past wars are all factors that determine the importance of an infectious disease to the U.S. Military.

NAMRU-6 Researchers Collaborate with CDC on Influenza Article

Researchers from the U.S. Naval Medical Research Unit No. 6 ([NAMRU-6](#)) department of emerging infections in Lima, Peru, recently collaborated with the U.S. Centers for Disease Control and Prevention (CDC) on a manuscript published in *Lancet Infectious Diseases* titled, "Estimated global mortality associated with the first 12 months of 2009 pandemic influenza A H1N1 virus circulation: a modeling study."

The scientists used data of symptomatic attack rates for 2009 pandemic influenza A H1N1 from an ongoing NAMRU-6 community-based influenza cohort composed of four cities in Peru and combined the data with estimates of respiratory tract infection death rates from high-income countries to estimate the number of deaths associated with 2009 pandemic H1N1 influenza.

The article concludes that deaths

associated with 2009 pandemic influenza A H1N1 were actually 15 times higher than reported using estimates from laboratory-confirmed deaths. This information highlights the additional benefits of community-based data over disease surveillance collected from hospital laboratories, especially in developing countries. The data used from the NAMRU-6 influenza cohorts are funded by the CDC and the Department of Defense (DoD) Global Emerging Infections Surveillance and Response System (GEIS) and provided the only data that exists in Peru to help estimate the global burden of influenza.

The aim of GEIS is to contribute to the protection of all DoD personnel and the global community through an integrated worldwide emerging infectious disease surveillance system.

GEIS was created in 1997 to provide a

mechanism within DoD to centralize coordination of surveillance efforts conducted through DoD overseas medical research and development laboratories. All host country partner activities are directed toward improvement of each country's diagnostic and reporting requirements in accordance with the World Health Organization.

NAMRU-6 conducts infectious disease research and surveillance in South America that includes prevention strategies, clinical trials, diagnostics, epidemiology and ecology. Researchers partner with the Peruvian Army and Navy, prestigious universities like Cayetano-Heredia and San Marcos, the Ministry of Health, the U.S. Agency for International Development, the CDC, the U.S. National Institutes of Health, and several American universities.

Capt. Kevin Porter Retires After 23 Years in the Navy

July 20, 2012, Capt. Kevin Porter, head of the Infectious Diseases Directorate at the Naval Medical Research Center, retired from the U.S. Navy. His ceremony was held at NMRC in Silver Spring, Md. A native of Atlanta, Ga., Porter's college education began there at Morehouse College. He continued on at Duke University School of Medicine and was commissioned as an Ensign during his second year. Porter had an accomplished career with the Navy, beginning with the Naval Medical Research Institute in Bethesda, Md. At the Naval Medical Research Unit No. 2 in Jakarta, Indonesia, he served as the head of the Viral Diseases Department and command medical officer.

As a professor of medicine, he taught at the Uniformed Services University of the Health Sciences in Bethesda, Md. Porter is an expert in dengue virus research and is active in dengue vaccine development efforts. *Science Spectrum Magazine* named him as a *Science Spectrum Trailblazer* in 2006 for his work in dengue virus research.

Photo, from left: Dr. Larry Laughlin, USUHS Dean School of Medicine; Capt. Kevin Porter, Head of NMRC IDD; and Capt. Richard L. Haberberger, Jr., NMRC Commanding Officer.



20 Years of Military Service for HM1 George W. Odom

Hospital Corpsman 1st Class George W. Odom retired from the U.S. Navy July 27, 2012. Odom's ceremony included a host of family and friends, many travelling from Alabama, his home state, to share this special occasion. Odom enlisted in the Navy in 1991. Some of his assignments included the Naval Ocean Processing Facility in Dam Neck, Va.; USNS ZEUS Cheatham Annex in Williamsburg, Va.; Naval Dental Center in Norfolk, Va.; Naval Medical Center in Portsmouth, Va.; and Naval Medical Research Center--Biological Defense Research Directorate.

In addition to degrees in Medical Laboratory Science and Workforce Education, Training and Development, Odom received dual bachelor degrees in Theology and Biblical Studies and a master's degree in Biblical Counseling. His Navy career has been an honorable one that he is proud of, and he is also proud of his family and the support they have given him to be the man who he is—as a son, a husband, a father, a brother, and as a sailor that has stood the watch for his country for 20 years.

Former NAMRU-2 Employee Helps with NMRC/NIH Vaccine Trial

(Continued from page 1)

Mr. Sutamihardja's microscopy expertise. He has worked with our Navy colleagues for decades and is highly respected. I was thrilled we could bring him aboard. He has extensive experience with the accurate diagnosis of malaria via blood smear, a skill central to the successful outcome of the trial."

Malaria is caused by a parasite called *Plasmodium*, which is transmitted via the bites of infected mosquitoes. In the human body, the parasites multiply in the liver and then infect red blood cells. Symptoms of malaria include fever, headache and vomiting, and usually appear between 10 and 15 days after the mosquito bite. If not treated, malaria can quickly become life-threatening by disrupting the blood supply to vital organs. In many parts of the world, the parasites have developed resistance to a number of malaria medicines.

"Malaria is killing people in Africa and Southeast Asia and it is good to do something to change this situation," said Sutamihardja. "When I was at NAMRU-2, the lab was doing malaria research to find new anti-malarial drugs because most of the anti-malarial drugs used in Southeast Asia were not working because of drug-resistant parasites."

He went on to add, "There are four

species of malaria transmitted from humans to humans (a fifth species is passed to humans from monkeys); the most important for us is *Plasmodium falciparum*. Not many people can identify the various species via blood smears, and the identification is important to determine an infection and the necessary treatment."

"Only a few people have the expertise to identify the different species using blood smears and a special microscope in the field," said Sutamihardja. "Microbiologists can identify the species in the laboratory, but those techniques are not practical in the field. Doing an initial identification of malaria is not easy because of the low number of parasites typically present in the blood smear, yet it is imperative to do so to begin immediate treatment for the patient."

This is also true for the 23 volunteers who are participating in this trial. Exposing healthy human volunteers to *Plasmodium falciparum*-infected mosquito bites is an accepted tool in clinical malaria vaccine development. The first of two malaria challenges scheduled over three months took place July 10.

"Our strategy for this vaccine is based on decades of research, much of it performed by investigators at NMRC dating as far back as the early 1970s, showing that protection can be

achieved by exposing humans to bites of mosquitoes infected with the malaria parasite which is weakened (attenuated) by irradiation," said Epstein. "We have shown that a vaccine can be manufactured according to FDA standards, given safely, and it can generate an immune response and partial protection. So we know we are headed in the right direction. More research still needs to be done, and future research and clinical trials will be critical in telling us whether we can indeed provide a highly protective vaccine for the military and for the millions suffering and dying from malaria overseas."

There is currently no licensed malaria vaccine. Despite available malaria drug prophylaxis and personal protective measures, malaria remains one of the most significant potential mission-aborting disease/non-battle injury threats to U.S. military personnel deployed to tropical regions of the world. This threat to operational readiness was demonstrated during the brief deployment of the 26th Marine Expeditionary Unit to a peacekeeping mission to Liberia in 2003. Despite prophylaxis and personal protective gear, over a quarter of the operational force developed malaria, requiring evacuations to shore installations and treatment in intensive care units.

Navy Researcher Gets High Marks for STEM Presentation

(Continued from page 4)

My ultimate goal was to plant a seed in these students and to challenge them in using biotechnology to address multiple infectious disease problems in all sort of austere environments," said Pimentel. "I hope this opportunity will repeat itself next year. This is a great opportunity for a Navy microbiologist to showcase our outstanding contribution to science. I am looking forward to working with Hagerstown Community College."

Mylynh Nguyen, the HCC biotechnology advisor who coordinated the summer program, told Pimentel that he

provided a fascinating presentation to the students.

"The insights you shared from your research and military experience really captured the students' attention and have undoubtedly fueled their interest in pursuing careers in science," Nguyen told Pimentel. "I think the overarching themes of public service and making an impact on society through scientific research really resonated with the students. The clinical microbiology and epidemiology stories from the field were all very interesting, and we are fortunate that you were able to share a few examples with the

students. I especially appreciated the history that you shared about pathogens, scientists and surveillance techniques."

Researchers at NMRC BDRD work to advance research and develop therapeutics to protect the warfighter and the nation against biological attacks. BDRD personnel are very proud of their contributions to the biodefense of our nation and are actively engaged in science, technology, engineering and mathematics outreach, including working with local schools, judging science fairs and providing lectures in basic and advanced scientific topics.

NAMRU-Dayton Research Psychologist Leads Fatigue Workshop

By Dr. Beth Hartzler

As evidenced by the growing number of aviation mishaps, workplace accidents and associated health problems, fatigue due to sleep loss continues to be a major concern for health and productivity in industrialized countries. Due to sustained operations and long-haul flights necessary to support the nation's ongoing military efforts, it is inevitable that aircrew and other military personnel will experience sleep loss, resulting in severe fatigue and greater difficulty fulfilling their role in the mission.

As part of the Aerospace Medical Association's 83rd Annual Scientific Meeting, a workshop led by Dr. John Caldwell, chief science officer at Fatigue Science, Honolulu, and Dr. Lynn Caldwell, senior research psychologist with the Naval Medical Research Unit-Dayton ([NAMRU-](#)

[Dayton](#)), expounded on many of the fatigue-related issues most important for aircrews. The workshop was attended by nearly 80 people representing numerous countries and professional backgrounds, such as safety officers, general practice physicians, and instructors. The variety of academic and research backgrounds present for the workshop was a testament to the severity of fatigue as a problem not only for military aviation, but also for the general population.

The primary focus of the workshop was to explain some of the potential causes of sleep loss, what effects fatigue may have on performance and health, and what options may be most effective to mitigate these effects. John and Lynn Caldwell took turns explaining issues such as the importance of proper scheduling to help avoid fatigue as well as effective



A flight captain taking a break on the flight deck. Photo by Justin Sullivan/Getty Images.

countermeasures that are currently available to members of the different service areas. The workshop also provided an excellent opportunity for those attending to ask questions of the presenters and of others in the room and to exchange personal experiences and observations on fatigue-related concerns.

Greetings from the NMRC Ombudsman!

Back-to-School is on the Horizon, Prepare Today. With the warm weather, pool parties, summer camps, and the fun of summer, it is hard to believe that Back-to-School is on the horizon. By the way, did you know that our current 9-month school calendar was born of a time when 85 percent of Americans were involved in agriculture? In those days, education took a back seat to summer harvests, freeing children to work the land with their families. Today, although few American's livelihoods revolve around the agricultural cycle, we still maintain a school system that grants children leisurely summers. In the same way that a well-deserved vacation from work can yield a reinvigorated return, the summer offers an opportunity for children to take a break from the routine of the school day and refresh their spirit.

However, the long 3-month hiatus from school can also set your child back. By some estimates, children are at risk of losing a least one month of the prior school year's educational gains over the summer. On average, standardized test scores were at least one month lower when students returned to school in the fall than when they left school prior to the summer. This trend is known to the educational community as "Summer Learning Loss." Do what you can to stem Summer Learning Loss in your kids. Enroll them in educational camps, engage them in summer reading lists, look for educationally themed trips to museums and national parks, and rediscover your local library. What better excuse than this to take your child to the local library for his or her own library card!

With the return to school just around the corner, it may also be the time to investigate your military educational benefits. If not you yourself, perhaps your child or spouse are eligible for educational benefits. Whether it is the Post 9/11 GI Bill or another educational program, you and your family may be eligible to save thousands of dollars while pursuing higher education. You earned these benefits, take advantage of them. Find out if you qualify. Visit the Veteran Administrations Educational Benefits Website at <http://www.gibill.va.gov/>.

Enjoy the rest of your summer!

Alexandra Mora
Ombudsman, NMRC

For more on Summer Learning Loss, check out the following websites: Education Resources Information Center – <http://www.eric.ed.gov/>; video from the Secretary of the Department of Education, Arne Duncan – <http://www2.ed.gov/news/av/video/2009/06/interview.html>

NAMRU-6 Participates in Global NIH Influenza Meeting in Peru

By NAMRU-6 Public Affairs

Scientists and technicians from the U.S. Naval Medical Research Unit No. 6 ([NAMRU-6](#)) attended the U.S. National Institutes of Health, Fogarty International Center sponsored Multinational Influenza Seasonal Mortality Study (MISMS), Latin America Influenza Meeting and Training Workshop in Lima, Peru, June 25-28. The conference focused on factors that determine the pattern and predictability of the spread of respiratory disease. Many of the featured speakers were world authorities in their respective disciplines of influenza research, including intricate genetic mapping and advanced time-series analyses of disease. Four NAMRU-6 researchers spoke about the challenges of respiratory disease surveillance, population-based influenza surveillance in Peru, and influenza and the human-animal interface.

The conference was attended by more than 110 regional influenza researchers from NAMRU-6, the Peruvian Ministry of Health, and numerous foreign hospitals, universities and militaries. Many countries were represented, including the United States, Peru, Ecuador, Colombia, French Guiana, Brazil, Paraguay, Uruguay, Argentina, Chile, Honduras, Nicaragua, Mexico, the United Kingdom, and China.

At the Training Workshop, extensive discussion about future collaborations occurred between NAMRU-6 and NIH researchers, including projects on tracing influenza virus resistance propagation throughout multiple Latin American countries and seasonality of parainfluenza virus infection. In addition, a significant amount of time was dedicated to hands-on training using cutting-edge epidemiological computer programs, many of which will now be used by researchers at NAMRU-6.

The U.S. military has become a global leader in respiratory disease surveillance and research. Since the turn of the century, Department of Defense surveillance has been vital in identifying some of the first cases of avian influenza in Southeast Asia and swine influenza in the Americas.

Over the last century, influenza and the U.S. military



Four NAMRU-6 scientists lectured at the MISMS, Latin American Influenza Meeting and training Workshop in Lima, Peru. From left: Bruno Gherzi, DVM; Yeny Tinoco, DVM; Lt. Col. Eric Halsey, USAF, MC; and Laguna-Torres, MD/PhD.

have been inextricably linked. The Great Influenza, or the 1918 influenza pandemic, had a severe impact on U.S. servicemembers. Years later, in 1976, a young U.S. Army private succumbed to swine influenza at Fort Dix, leading to worldwide concern but no ensuing pandemic. Since then, the U.S. military has experienced multiple outbreaks of respiratory disease caused not only by the influenza virus, but also by a diverse list of other pathogens. These outbreaks have disrupted basic training, impacted deployments in foreign countries, and interrupted naval exercises.

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